

REMARKS/ARGUMENTS

Applicant has carefully reviewed and considered the Office Action mailed on December 13, 2005, and the references cited therewith.

Claims 1, 3, 5, 7, 9, 12, and 33-37 are amended, claims 15-32 and 42-56 are withdrawn, and no claims are canceled or added; as a result, claims 1-14, 33-41, and 57-67 are now pending in this application.

Claim Objections

Claim 1 is objected to because of the following informalities: "the gate electrode" should be "a gate electrode". Appropriate correction has been made in the above listing of the claims.

§103 Rejection of the Claims

Claims 1-14, 33-41, and 57-67 were rejected under 35 USC § 103(a) as being unpatentable over Kawasaki, et al. (EP 1134881) in combination with Cillessen, et al. (WO 97/06554). Applicant respectfully traverses the rejection as follows.

The Examiner states, "Kawasaki et al. teach the channel layer comprises of ZnO but fail to teach that the channel layer further comprises Ga or In and Ge or Sn or Pb and Zn or Cd", and several other elements. By stating in column 6, lines 49-50, "[Z]nO doped with any one of group III elements (B, Al, Ga, In, Tl)", the Kawasaki reference appears to describe conductive material limited to ZnGaO or ZnInO, i.e., three element compounds, as far as the elements recited in the present application are concerned. The Examiner goes on to state, "Cillessen et al. teach the presence of Ga or In and Ge or Sn or Pb and Zn or Cd", and several other elements. The Cillessen reference states, "[P]referably, the basic material comprises a covalent oxide of a metal from the group Sn, Zn, and In." (Page 2, lines 31-32). Cillessen goes on to state, "[D]opant atoms are attuned to the covalent oxides used. Dopant atoms such as Sb, F, or Cl may thus be used when SnO₂ is the covalent oxide, Sn dopant atoms for In₂O₃, and Ga dopant atoms for ZnO as the oxide." (Page 2, line 33, through page 3, line 1). By limiting the dopant possibilities to one element for

ZnO, i.e., Ga, as contrasted to three possible dopant elements for SnO₂, Cillessen appears to limit the compounds containing Zn to consisting of three elements, i.e., ZnGaO.

Cillessen only appears to describe Cd as a component of the three element compound CdGa₂O₄. (Page 7, lines 2-10). Hence, Cd appears to be limited in Cillessen to being in a three element compound and not in a four element oxide compound used as a channel contacting the drain electrode and the source electrode.

The Kawasaki and Cillessen references, for at least the reasons provided above, do not describe, teach, or suggest a channel including one or more compounds of the formula A_xB_xC_xO_x, wherein each A is selected from the group of Zn, Cd, each B is selected from the group of Ga, In, each C is selected from the group Ge, Sn, Pb, each O is atomic oxygen, each x is independently a non-zero number, and each of A, B, and C are different from each other and from O.

In contrast, Applicant's independent claim 1, as amended, recites:

[a] channel contacting the drain electrode and the source electrode, wherein the channel includes one or more compounds of the formula A_xB_xC_xO_x, wherein each A is selected from the group of Zn, Cd, each B is selected from the group of Ga, In, each C is selected from the group Ge, Sn, Pb, each O is atomic oxygen, each x is independently a non-zero number, and each of A, B, and C are different from each other and from O;

The only four element compounds that are described in the cited references are in Cillessen and they all can be represented by Pb_xZr_xTi_xO₃, none of which contain Zn or Cd. Cillessen states, "[A]n additional advantage is obtained when the insulating layer comprises a ferroelectric material", e.g., Pb. (Page 3, lines 10-11). Cillessen goes on to state, "[P]referably, lead-zirconium titanate is chosen". (Page 3, lines 12-13). Hence, the only compound containing four different elements is described in Cillessen as material for the insulating layer, which is comparable to the gate dielectric in Kawasaki and the present application, rather than "[a] channel connecting the drain electrode and source electrode", as recited in Applicant's claim 1, as amended.

Independent claim 12, as amended, recites:

means for a channel to electrically couple the drain electrode and the source electrode;

means for the channel to include one or more compounds of the formula $A_xB_xC_xO_x$, wherein each A is selected from the group of Zn, Cd;

Independent claim 33, as amended, recites:

[p]roviding a precursor oxide composition including one or more precursor compounds that each include A_x , one or more precursor compounds that each include B_x , and one or more precursor compounds that each include C_x , wherein each A is selected from the group of Zn, Cd, each B is selected from the group of Ga, In, each C is selected from the group Ge, Sn, Pb, each x is independently a non-zero number, and wherein each of A, B, and C are different from each other and from O;

depositing a channel including the precursor composition to form a multicomponent oxide including $A_xB_xC_xO_x$ from the precursor composition to electrically couple the drain electrode and the source electrode;

In addition, independent claim 57 recites:

[a] channel contacting the drain electrode and the source electrode, wherein the channel includes one or more of a metal oxide including zinc-gallium-germanium, zinc-gallium-tin, zinc-gallium-lead, cadmium-gallium-germanium, cadmium-gallium-tin, cadmium-gallium-lead, zinc-indium-germanium, zinc-indium-tin, zinc-indium-lead, cadmium-indium-germanium, cadmium-indium-tin, cadmium-indium-lead;

As such, Applicant respectfully submits that the Kawasaki and Cillessen references, either individually or in combination, do not describe, teach, or suggest each and every element and limitation in independent claims 1, 12, 33, as amended, and 57. Accordingly, Applicant respectfully requests reconsideration and allowance of independent claims 1, 12, 33, as amended, and 57, as well as those claims that depend therefrom.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney Donald J. Coulman at (541) 715-1694 to facilitate prosecution of this matter.

At any time during the pendency of this application, please charge any additional fees or credit overpayment to the Deposit Account No. 08-2025.

CERTIFICATE UNDER 37 CFR §1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS AMENDMENT Commissioner for Patents, P.O. BOX 1450, Alexandria, VA 22313-1450 on this 28th day of February, 2006.

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